

REMARKS

Reconsideration and allowance of the present application are requested in light of the amendments above and the remarks that follow. By this Amendment, claims 1-14 have been amended and claims 15-20 have been added. Claims 1-20 are now pending.

In the Office Action, the Examiner made the following objection and rejections:

- claims 1 and 4-8 were objected to as being informal;
- claims 1-7 were rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over U.S. Patent No. 6,396,374 to *Asano et al.* ("*Asano '374*") in view of U.S. Patent Application Publication No. 2002/0171309 to *Wakui et al.* ("*Wakui '309*");
- claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over the purported combination of *Asano '374* and *Wakui '309* in view of U.S. Patent No. 4,658,165 to *Vanderschaeghe*;
- claims 1-7 were rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over *Asano '374* in view of U.S. Patent No. 5,962,944 to *Narita et al.* ("*Narita*") and U.S. Patent No. 6,008,559 to *Asano et al.* ("*Asano '559*.);
- claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over the purported combination of *Asano '374*, *Narita*, and *Asano '559* in view of *Vanderschaeghe*;
- claims 10 was were rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over the purported combination of *Asano '374*, *Narita*, and

Asano '559 in view of U.S. Patent Application Publication No. 2002/0140308 to *Inayama et al.* ("*Inayama*");

- claim 11 was rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over *Asano '374* in view of U.S. Patent No. 5,386,161 to *Sakamoto* and *Asano '559*;
- claim 12 was rejected under 35 U.S.C. § 103(a) as not being patentable over the purported combination of *Asano '374*, *Sakamoto* and *Asano '559* in view of U.S. Patent No. 5,225,425 to *Kanno*;
- claim 13 was rejected under 35 U.S.C. § 103(a) as not being patentable over the purported combination of *Asano '374*, *Sakamoto* and *Asano '559* in view of *Booth*; and
- claim 14 was rejected under 35 U.S.C. § 103(a) as allegedly not being patentable over the purported combination of *Asano '374*, *Sakamoto* and *Asano '559* in view of U.S. Patent No. 5,763,967 to *Kurosawa et al.* ("*Kurosawa*")

Objection to Claims 1 and 4-8

The Examiner objected to claims 1 and 4-8 for various typographical errors and misspellings. Applicant has amended claims 1 and 4-8 to address the informalities identified by the Examiner. (See *supra*.) Accordingly, Applicant respectfully requests that the objection to these claims be withdrawn.

Rejection of Claims 1-7 Under 35 U.S.C. § 103(a) Based on *Asano '374* and *Wakui '309*

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), the applied references, taken alone or in combination, must teach or suggest each and

every element recited in the claims. (See M.P.E.P. § 2143, (8th ed., rev. Aug. 2006.)) Applicant respectfully traverses the rejection of claims 1-7 under 35 U.S.C. § 103(a) because the Examiner's rejection of claims 1-7 based on *Asano* '374 and *Wakui* '309 fails in this regard.

The subject matter recited in Applicant's claim 1 broadly encompasses the non-limiting example illustrated in Applicant's Figure 1, which illustrates a cross-section of a single pole 9 of a rotor 4. Rotor 4 includes rotor sheets having slots 8 and permanent magnet elements 10 located in slots 8. The permanent magnet elements 10 are arranged so that the magnets on both sides of a pole 9 are essentially at the edges of the magnetic pole 9 in the vicinity of the outer circumference 3 of rotor 4.

Asano '374 discloses a method of magnetizing a permanent magnet material used in a rotor structure. (*Asano* '374, col. 1:11-16.) The Examiner concedes that *Asano* '374 fails to disclose "slots in the rotor poles ... extend[ing] from both edges of the pole essentially towards its center and that the slot is closer to the outer circumference of the rotor than the central axis of the rotor" (Office Action, p. 4:1-4) and cites *Wakui* '309 for allegedly teaching such features. Applicant respectfully disagrees.

The Examiner apparently asserts that *Wakui* '309's rotor 1, magnets 2, and magnetic flux short circuit preventative holes 3 correspond to the "rotor," "rotor pole," and "slots," as recited in Applicant's claim 1. However, amended claim 1 recites "slots in the rotor on the route of the magnetic flux extending from close to the first and second edges...of each of the plurality of magnetic poles." *Wakui* '309 discloses

that magnetic flux short circuit preventative holes 3 extend from the ends of the insertion holes for magnets 2. (*Wakui '309*, p. 3, ¶¶ 0052-0053.) FIGs. 1, 2 and 4-9 of *Wakui '309* all disclose slots 3 being connected to their respective magnets 2. Thus, *Wakui '309* does not teach or suggest "slots," as recited in Applicant's claim 1. As their name suggests, "magnetic flux short circuit preventative holes" disclosed by *Wakui '309* serve a different purpose than Applicant's claimed "slots," which provide an air gap flux having a sinusoidal form.

Accordingly, *Asano '374* and *Wakui '309*, when taken individually or in any proper combination do not teach or suggest "slots," as recited in Applicant's claim 1. Claim 1 is therefore patentable because *Asano '374* and *Wakui '309* cannot support a rejection of claim 1 under 35 U.S.C. § 103(a). Claims 2-7 are also patentable at least due to their dependence from claim 1.

Rejection of Claims 8 & 9 Under 35 U.S.C. § 103(a)
Based on *Asano '374* and *Wakui '309* and *Vanderschaeghe*

Claims 8 and 9 depend from claim 1 and, thus, include all the limitations of claim 1. As argued above with regard to claim 1, *Asano '374* and *Wakui '309* do not disclose or suggest "slots," as recited in claim 1. (*See supra.*) Thus, these references fail to disclose or suggest the same features of claims 8 and 9.

The Examiner relies on *Vanderschaeghe* for allegedly disclosing "several slots extending from both edges of the pole towards the center of the pole." (Office Action p. 7:1-6.) Apparently, the Examiner asserts that slots 7 disclosed by *Vanderschaeghe* correspond to the "slots" recited in Applicant's claim 1. (*Vanderschaeghe*, col. 3:56-64; Fig. 1.) To the contrary, the slots disclosed in *Vanderschaeghe* are arranged radially. (*Id.*) *Vanderschaeghe* does not disclose or

suggest, "slots in the rotor on the route of the magnetic flux extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles" wherein "[the] first edge and [the] second edge [are] located close to the outer circumference of the rotor," as recited in Applicant's claim 1. Thus, *Asano* '374, *Wakui* '309 and *Vanderschaeghe*, whether taken alone or in combination, fail to disclose "slots," as recited in Applicant's claim 1. Accordingly, these references cannot support a rejection of claims 8 and 9 under 35 U.S.C. § 103(a) due to their dependence from claim 1.

Rejection of Claims 1-7 Under 35 U.S.C. § 103(a)
Based on *Asano* '374, *Narita* and *Asano* '559

Applicant traverses the rejection of claims 1-7 as allegedly not being patentable over *Asano* '374 in view of *Narita* and *Asano* '559. As conceded by the Examiner, *Asano* '374 does not disclose Applicant's claimed "slots." *Narita* and *Asano* '559 do not overcome this deficiency of *Asano* '374.

With regard to *Narita*, the Examiner apparently asserts that the flux barrier holes 34a & 34b correspond to Applicant's claimed "slots." (Office Action p. 9:4-7.) *Narita*'s holes 15a & 15b (34a & 34b in FIG. 14) are formed "within the shadow area of the cross-sectional arc shape of the first permanent magnet 30." (*Narita*, cols. 7:52-56, 11:8-10.) But, *Narita* does not disclose or suggest "slots...extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles" (emphasis added), as recited in Applicant's claim 1. Moreover, as shown in FIGs. 4 and 16, for example, 15a & 15b or 34a & 34b are located outside the lines of magnetic flux. Accordingly, holes 15a & 15b or 34a & 34b are not "slots ... on the route of the magnetic flux," as recited in Applicant's claim

1. Furthermore, Applicant notes that holes 34a & 34b are apparently for the purpose of avoiding short-circuiting of magnetic flux and leakage of the magnetic flux at each end of magnet 32a. (*Narita*, col. 7:52-57.) The Examiner apparently recognizes that *Narita* fails to cure the above-noted deficiency of *Asano* '374 and looks to *Asano* '559 for this purpose.

However, similar to *Asano* '309, *Asano* '559 discloses a hole 27 for preventing magnetic flux from being short-circuited and discloses that "hole 27...adjoins the slit 22 as well as each end of the permanent magnet 23." (*Asano* '559, col. 4:8-46.) Accordingly, *Asano* '559 also does not disclose "slots...extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles," as recited in Applicant's claim 1.

Therefore, *Asano* '374, *Narita* and *Asano* '559 fail to teach or suggest "slots in the rotor on the route of the magnetic flux extending from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles," as recited in Applicant's claim 1. Moreover, nothing in these references or the ordinary knowledge of an artisan would suggest combining the references in the manner asserted by the Examiner.

Rejection of Claims 1-7 Under 35 U.S.C. § 103(a)
Based on *Asano* '374, *Narita*, and *Asano* '559 in view of *Vanderschaeghe*

Claims 8 and 9 depend from claim 1 and, thus, includes all the limitations of claim 1. As argued above with regard to claim 1, *Asano* '374, *Narita*, and *Asano* '559 does not disclose or suggest "slots," as recited in claim 1. (*See supra.*) In addition, as previously argued with regards to claims 8 and 9, *Vanderschaeghe* does not disclose or suggest, "slots in the rotor on the route of the magnetic flux extending

from close to the first and second edges essentially towards the center of each of the plurality of magnetic poles" wherein "[the] first edge and [the] second edge [are] located close to the outer circumference of the rotor," as recited in Applicant's claim 1. Thus, *Asano '374*, *Narita*, *Asano '559* and *Vanderschaeghe*, whether taken alone or in combination, fail to disclose "slots," as recited in Applicant's claim 1. Accordingly, these references cannot support a rejection of claims 8 and 9 which depend from claim 1.

Rejection of Claim 10 Under 35 U.S.C. § 103(a)
Based on *Asano '374*, *Narita*, *Asano '559* and *Inayama*

Claim 10 depends from claim 1 and, therefore, includes all the features recited in claim 1. *Asano '374*, *Narita*, and *Asano '559* fail to disclose or suggest "slots," as recited in Applicant's claim 1. (*See supra.*) *Inayama* does not cure the deficiencies of *Asano '374*, *Narita*, and *Asano '559*.

The Examiner cites *Inayama* for its purported disclosure of permanent magnets are located on the surface of the outer circumference of the rotor and that the slots are arranged inside the rotor at the positions of the permanent magnets in terms of the radial direction of the rotor. (office Action, p. 14:11-18.) *Inayama* does not disclose or suggest "slots" as recited in claim 1. Accordingly, *Asano '374*, *Narita*, *Asano '559* and *Inayama*, when taken individually or in combination" cannot support a rejection of claim 10 under 35 U.S.C. § 103(a).

Rejection of Claim 11 Under 35 U.S.C. § 103(a)
Based on *Asano '374*, *Sakamoto* and *Asano '559*

Although of different scope than claim 1, claim 11 recites features similar to those recited in claim 1. For instance, claim 11 recites, *inter alia*, "forming axial slots

in the rotor within at least one of the plurality of rotor poles, the slots being close to the outer circumference of the rotor, and extending from close to a first edge and a second edge towards the center of the at least one of the plurality of rotor poles.”

Asano '374 and *Asano* '559 do not teach or suggest the “slots” recited in Applicant's claim 1 and, therefore fail to disclose the “slots” recited in Applicant's claim 11.

Sakamoto does not overcome the above-noted deficiencies. The Examiner cites *Sakamoto* for allegedly disclosing “a sinusoidal form in the air gap flux.” (Office Action, p. 16:9-13, citing *Sakamoto*, col. 6:55-57.) However, *Sakamoto* does not disclose or suggest “slots,” as recited in Applicant's claim 11. Thus, these references cannot support a rejection of claim 11 under 35 U.S.C. § 103(a).

Rejection of Claim 12 Under 35 U.S.C. § 103(a)
Based on *Asano* '374, *Sakamoto*, *Asano* '559 and *Kanno*

Claim 12 depends from claim 11 and therefore, includes all the features recited in claim 1. *Asano* '374, *Sakamoto*, and *Asano* '559 fail to disclose or suggest “slots,” as recited in Applicant's claim 1. (*See supra*). *Kanno* does not cure the deficiencies of *Asano* '374, *Narita*, and *Asano* '559.

Kanno is apparently cited by the Examiner for its purported disclosure of making slots by die-cutting. (Office Action, p. 17:5-12.) *Kanno*, however, does not disclose or suggest Applicants' claimed “slots.” Accordingly, *Asano* '374, *Sakamoto*, *Asano* '559 and *Kanno*, when taken individually or in combination” do not support a rejection of claim 12 under 35 U.S.C. § 103(a).

claim 12 was rejected under 35 U.S.C. § 1039a) as not being patentable over the purported combination of *Asano* '374, *Sakamoto* and *Asano* '559 in view of the U.S. Patent No. 5,225,425 to *Kanno*;

Rejection of Claim 13 Under 35 U.S.C. § 103(a)
Based on Asano '374, Sakamoto, Asano '559 and Booth

Claim 13 depends from claim 11 and, therefore, includes all the features recited in claim 1. *Asano '374, Sakamoto, and Asano '559* fail to disclose or suggest "slots," as recited in Applicant's claim 1. (See *supra*.) *Booth* does not cure the deficiencies of *Asano '374, Narita, and Asano '559*.

Booth is apparently cited by the Examiner for its purported disclosure of making slots by laser-cutting. (Office Action, p. 18:6-13.) *Booth*, however, does not disclose or suggest Applicants' claimed "slots." Accordingly, *Asano '374, Sakamoto, Asano '559 and Booth*, when taken individually or in combination" do not support a rejection of claim 13 under 35 U.S.C. § 103(a).

Rejection of Claim 14 Under 35 U.S.C. § 103(a)
Based on Asano '374, Sakamoto, Asano '559 and Kurosawa

Claim 14 depends from claim 11 and, therefore, includes all the features recited in claim 1. *Asano '374, Sakamoto, and Asano '559* fail to disclose or suggest "slots," as recited in Applicant's claim 1. (See *supra*.) *Kurosawa* does not cure the deficiencies of *Asano '374, Narita, and Asano '559*.

Kurosawa is apparently cited by the Examiner for allegedly disclosing drilling axial holes in a rotor. (Office Action, p. 18:19-19-4.) *Kurosawa*, however, does not disclose or suggest Applicants' claimed "slots." Accordingly, *Asano '374, Sakamoto, Asano '559 and Kurosawa*, when taken individually or in combination" do not support a rejection of claim 13 under 35 U.S.C. § 103(a).

New Claims 15-20

Independent claim 15, although of different scope than claim 1, recites features similar to those recited in claim 1. For example, claim 15 recites, *inter alia*, "slots extending[ing] from close to the tip-ends toward the other one of the tip-ends of the at least one of the plurality of permanent magnet pairs." As already discussed above with regard to claim 1-14, the references cited by the Examiner fail to disclose or suggest "slots" as recited in claim 1. Accordingly, the applied references do not disclose or suggest the above-noted "slots," as recited in Applicant's claim 15 for similar reasons. Accordingly, the applied references, when taken individually or in any proper combination, cannot support a rejection of claim 15. Claim 15 is, therefore, patentable over the applied references and so are claims 16-20 at least due to their dependence from claim 15.

Conclusion

In light of the foregoing, claims 1-20 are allowable over the applied references. Applicant respectfully request reconsideration and allowance of this application.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition in this case.

Respectfully submitted,

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